

Refraction of waves

We guess the study in detail of seismic waves is very useful to get to know the inner Earth.

Let's talk about the path -la trayectoria- followed by seismic waves.

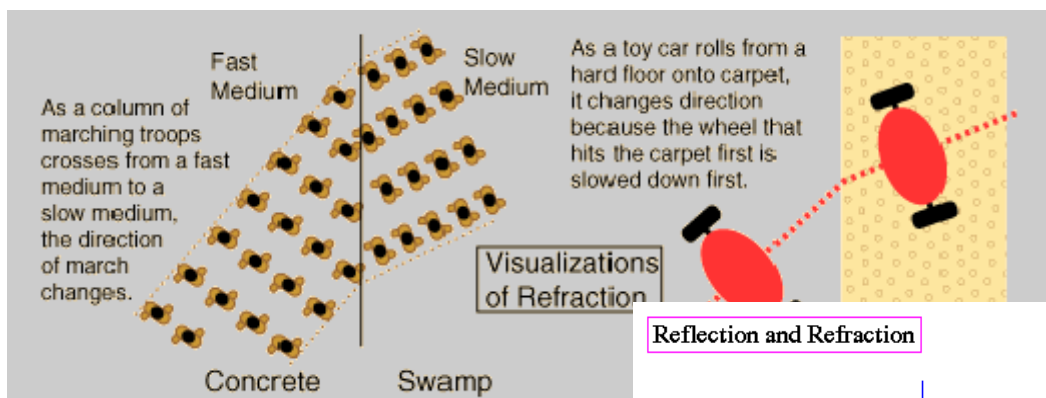
- **First: Read the explanations below, please.** (For our purpose, pag 1 and 2 are important but explanations on light refraction are really interesting. Leave light phenomena to the end, after watching the videos because if not you will be exhausted)
- **Watch the explanation on [this video](#)** from Khan Academy (Great!! I promise)

Questions you should answer: -Help yourself with drawings-

1. Are seismic P- and S-waves refracted when they travel throughout the Earth? Explain your answer. Drawings needed
1. How do we know the interior of the Earth is not uniform but made of different materials? Drawings needed
2. How do materials inside the Earth change? Do they change gradually or sharply -gradualmente o bruscamente-? Drawings needed
3. What does this mean: "There is a S-wave shadow and a P-wave shadow? -Drawings needed. Watch [this video](#), please

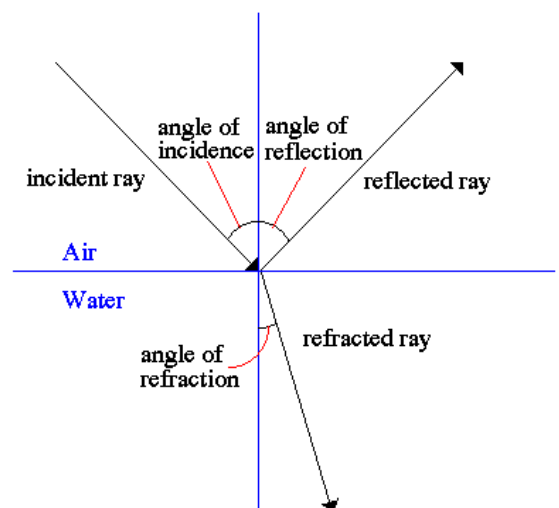
YOU SHOULD COPY IN YOUR NOTEBOOK PAGES 1 AND 2 IN THIS DOCUMENT, AS WELL AS YOUR ANSWERS

When waves move from one medium to another, the speed of the wave changes. This causes wave to bend and **the bending of wave is called REFRACTION OF WAVE**. The diagram below illustrates **WHY** refraction occur.



Refraction of light wave

When light wave travels between two medium of different density, the speed of the light changes. This causes a change in the direction of the propagation of light, therefore REFRACTION takes place.

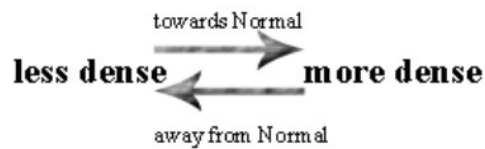


Angle form between the **Incident ray** and the **Normal** is called **angle of incidence**, i .

Angle form between the **Refracted ray** and the **Normal** is called **angle of refraction**, r .

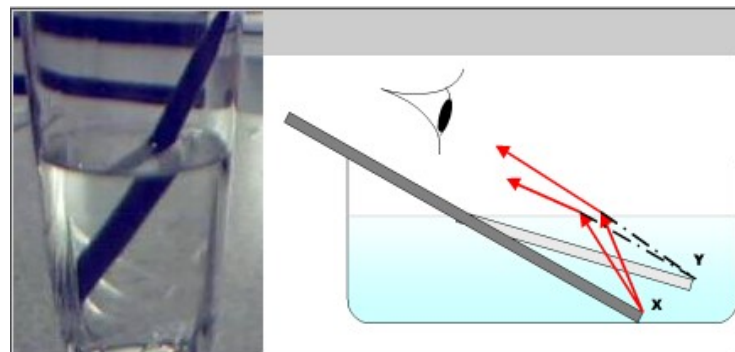
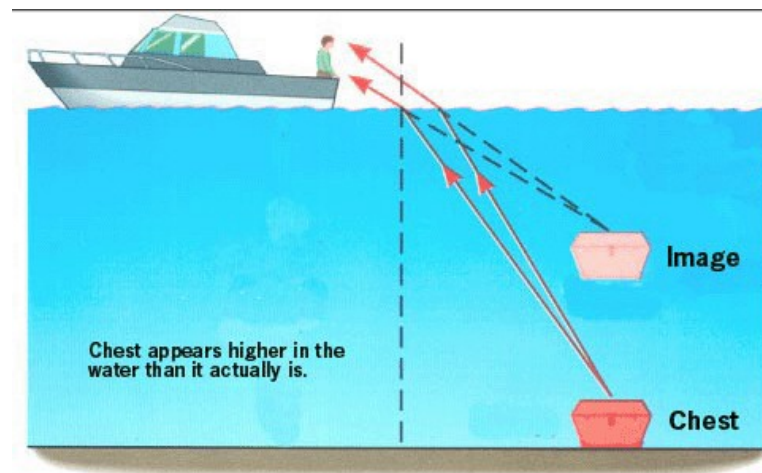
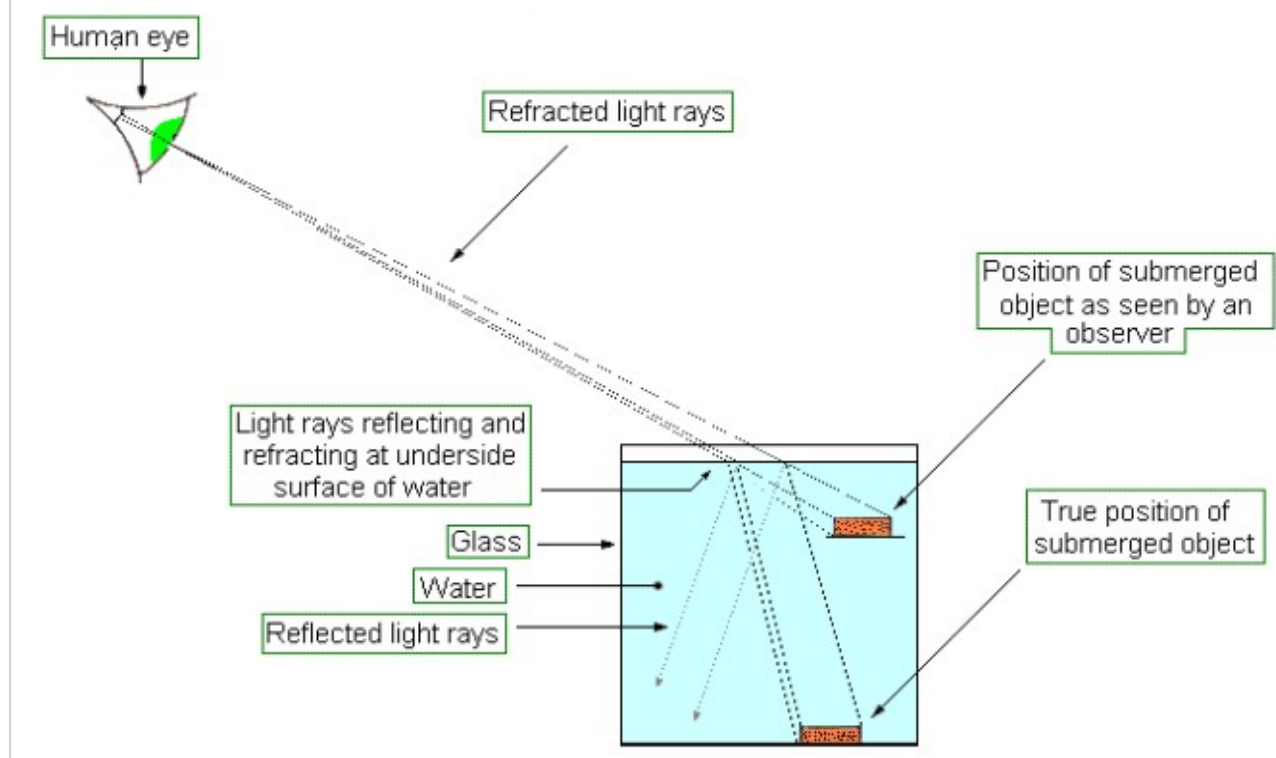
A medium in which the velocity of light is lower is a denser medium.

When light travels from **less dense medium** to a **denser medium**, it **bends towards the Normal**; **vice versa** when light travels from a **less dense medium** to a **more dense medium**, it **bends away from Normal**.



Phenomena of refraction of light in our daily lives

A river appear to be shallower than it actually is.

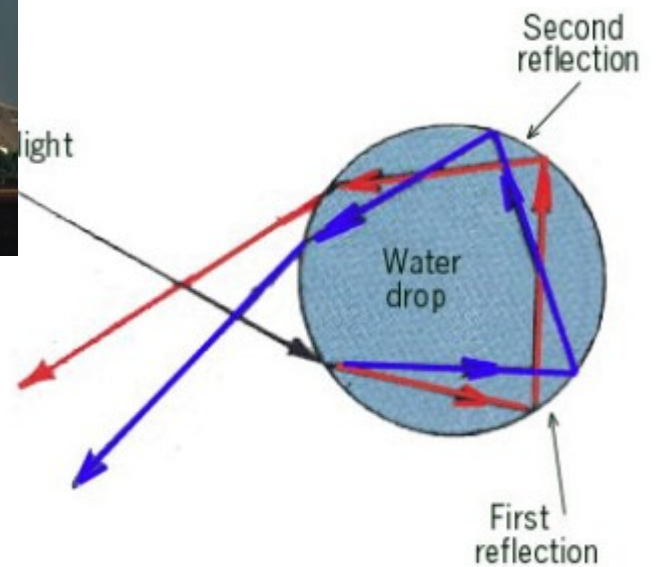


Refraction of light wave causes a pencil in the water to look bent

Rainbow is the consequence of rain drops reflecting the sunlight.



Sunlight consists of different wavelengths; each wavelength produces a different refraction angle, as shown in the drop below.



Sunlight consists of different wavelengths; **each wavelength** follows a **different refraction angle**, as shown in the drop.